CURRENT LITERATURE

NOTES FOR STUDENTS

The unarmored Peridiniales.—Excepting only the diatoms, no group of unicellular organisms is of such fundamental importance in the biology of the seas as the peridines, and there are few groups concerning which our knowledge is so unsatisfactory. This is particularly true of the unarmored forms, which are not only apt to be ruined in collecting, but, if they survive the plankton net, are destroyed by the preservatives used and usually remain recognizable for only a short time under the conditions speedily developed in a jar of sea water or on a microscopic slide. For these reasons all who have occasion to study the minute life of the ocean will heartily welcome the appearance of the splendid monograph by KOFOID and SWEZY.[1] About one-fifth of the text is devoted to topics of a general nature, the remainder to the detailed descriptions of genera and species. Among the topics discussed are the general and comparative morphology of the group, life cycles, physiology, including short but pregnant discussions of nutrition and luminescence, and finally evolutionary development and distribution. The authors take marked exception to WEST's statement that over 80 per cent of the peridines are "true vegetable organisms with a holophytic nutrition," declaring on the contrary that "the number actually containing chromatophores is relatively small throughout the entire Dinoflagellata." In spite of this, however, the great abundance of some of the forms characterized by undoubted holophytic nutrition insures that the group will continue to be of as great interest to the botanist as to the zoologist.

The authors regard the Peridiniales as a monophyletic group, derived from a cryptomonad ancestry, and describe a new genus, *Protodinifer*, which is one of the simplest known peridines. One line of development, starting near some such form, may have given rise to the *Haplodinium*, *Exuviella*, *Prorocentrum* series; another would lead to the simpler Gymnodiniaceae, from which coordinate lines of development lead on the one hand to the higher unarmored forms, culminating in such elaborately organized genera as *Pouchetia* and *Erythropis*, and on the other hand to the thecate forms, such as *Ceratium*.

The systematic treatment includes descriptions of 223 species, distributed among 16 genera, of which *Protodinifer*, *Gyrodinium*, *Torodinium*, *Pavillardia*, *Protopsis*, *Nematodinium*, and *Proterythopsis* are new. Of these, *Torodinium*

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[1] KOFOID, C. A., and SWEZY, OLIVE, The free-living unarmored Dinoflagellata. Memoirs Univ. Cal. 5: viii+562. *pls.* 12 (colored). *figs.* 388. Univ. Cal. Press. Berkeley. 1921.

and *Protopsis* include in part previously described species, and *Gyrodinium* replaces SHÜTT's genus *Spirodinium* which is preoccupied zoologically. The other new genera are established to contain newly discovered species.

A few minor typographical errors occur, but in general the work is remarkably free from them. The text figures are irregularly distributed and frequently many pages from the references to them. It would greatly facilitate the use of the book if the references were by page instead of merely to the figure. These are trifling defects, however, in a work of such unusually permanent value. It is to be confidently expected that its publication will prove a distinct stimulus to further study in a field where there is still much to be learned.—G. W. MARTIN.

A new type of nuclear division.—CHATTON,[2] in a brief but significant paper throws new light on the peculiar nuclear phenomena in the Peridiniales described by LAUTERBORN, JOLLOS, BORGERT, and in his own earlier contributions. His studies were made on species of *Syndinium*, which live parasitically in the body cavity of copepods, especially favorable material because of the small number of chromosomes. These have previously been described as ten somewhat curved filaments from a single pole like the ribs of an umbrella. Further study has shown that this structure is in reality composed of five V-shaped chromosomes with very sharp bends, with the points of the V's converging at the pole. Cleavage takes place throughout the length of the chromosomes, so that ten V-shaped daughter chromosomes are formed. Five of these remain grouped about the original pole; the points of the remaining five become centered about a new pole which is at first close to the original one, then gradually moves away. In some species the cleavage is completed at once; in others the daughter chromosomes remain united at their tips and turn as upon a hinge, so that a bipolar spindle-shaped structure (not a true achromatic spindle) is formed, composed of the two series of V-shaped chromosomes converging at either end. The chromosomes then break apart, and it is this separation which was formerly interpreted as a transverse division of chromosomes, when it is in reality merely the final separation of chromosomes previously formed by longitudinal fission. Nothing resembling a true spindle was seen.

Ordinarily no resting stage appears to occur, but it was observed in certain cases where the development of the peridine had been inhibited by some factor, as, for example, the presence of another parasite. In such cases the nucleus appeared to be composed of a large number of microsomes grouped around a central nucleolus.

A division of this kind, while distinctly simpler than one taking place in connection with the usual achromatic structures, would appear to be quite as

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[2] CHATTON, EDOUARD, Sur un mecanisme cinetique nouveau. La mitose syndienne chez les Peridiniens parasites plasmodiaux. Compt. Rend. Acad. Sci. **173**: 859–862. *fig.* 1. 1921.